User's Manual
M-Series Sonar, VDSL

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System Contents

Along with the M-Series Sonar, you will receive an accessory kit containing the following:

ProViewer CD
Sonar to Surface Cable with VDSL and Ethernet
Cable Whip (4 ft.)
7ft Cat6 Ethernet Cable
60 W POE Box
Power Cable
Carrying Case
M-Series User's Manual
M-Series Quickstart Guide
VDSL Top Side Box with power cable
VDSL Top Side Whip (RJ11)

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Warning! This device should not be used as a navigational aid to prevent collision, grounding, boat damage, or personal injury.

Warning! This product contains lead, a chemical known to the state of California to cause cancer, birth defects and other reproductive harm. Handling and/or opening this unit may result in exposure to lead, in the form of solder.

Warning! Disassembly and repair of this electronic unit should only be performed by authorized service personnel. Any modification of the serial number or attempt to repair the original equipment or accessories by unauthorized individuals will void the warranty.

Warning! Changes or modifications to this unit not expressly approved by the party responsible for compliance may void the user's authority to operate this equipment.

Warning! This equipment contains High Voltage electronics. Tampering with or using damaged equipment could lead to serious injury.

Warranty Information:

The sonar is backed by a standard 12-month parts and labor warranty policy. Seller's terms and conditions of sale can be found at www.blueview.com.

For more information on safety and/or maintenance issues please call Teledyne BlueView, Inc. at 206.545.7260.

Chapter 1: M-Series Sonar Overview

Congratulations on your purchase of a Teledyne BlueView, Inc. 2D Miniature Multibeam Imaging Sonar system. The Teledyne BlueView, Inc. sonar is a general purpose underwater imaging sonar designed for ROV, AUV, vessel mounted, and stationary tripod integration. With its Ethernet interface and user-friendly software, the sonar system is designed to be just as easy-to-use as it is functional. This manual covers operations of the M-Series VDSL sonar systems.

About the Sonar

Teledyne BlueView, Inc. 2D imaging sonar provides streaming sonar imagery, making it easy to search and navigate in low and zero visibility water. Teledyne BlueView, Inc. has coupled high-performance imaging capability with a powerful software package creating one of the world's most versatile underwater imaging systems available today.

Advanced sonar technology, rugged design, and powerful software are just a few highlights of your sonar system. This manual explains imaging sonar interpretation and provides instructions on the installation and operation of your sonar system. For detailed information on using the sonar imaging software, please see the ProViewer Software Handbook found both on the software CD as well as under the software's help menu.

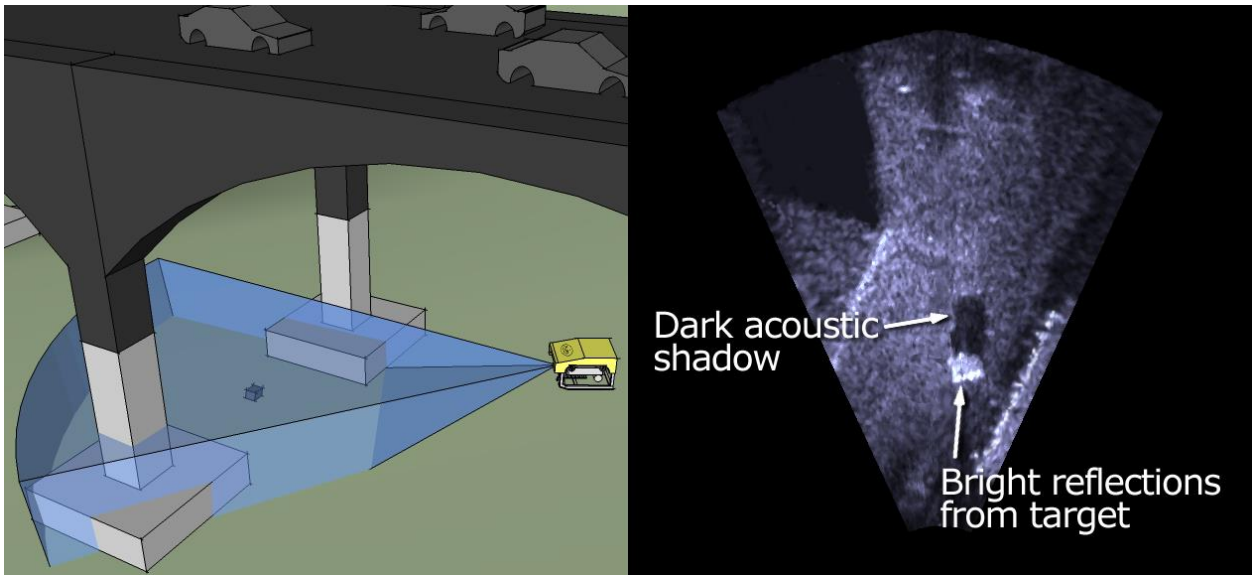
Chapter 2: Understanding Imaging Sonar

What is Imaging Sonar?

Many people are familiar with scanning type sonar, which employ mechanical rotation of a single acoustic beam over an imaging area. This works well when used on stationary platforms and/or when imaging static targets. They become much less useful when working from a moving platform and/or trying to image moving targets since any motion can cause errors in the final image. By comparison, Teledyne BlueView, Inc. imaging sonar are multi-beam sensors, which form many small acoustic beams at once. This allows them to work well from stationary and moving platforms. An imaging sonar can produce several high-quality images per second, making it possible to get movie-like imagery from the sonar.

How do I interpret the Sonar images?

Imagine a flashlight lying on a table and an object such as a coffee cup located in front of the flashlight. If you look down on this scene, you will see a bright area where light is reflecting off the face of the coffee cup. You will also see a dark shadow behind the coffee cup where light is unable to reach. The same idea can be applied to a Teledyne BlueView, Inc. imaging sonar by replacing the light source with a sound source. Bright areas on the sonar image are the result of objects reflecting sound, while dark areas are acoustic shadows resulting from an object blocking the sound. The two figures below provide an example of how a given scene would appear when viewed visually and with high-definition imaging sonar:



Chapter 3: Bench Top Setup

The following chapter contains step by step instructions for setting up your Teledyne BlueView, Inc. sonar.

Install the Software

Whether connected to an external PC or an onboard AUV controller the ProViewer software is required to operate the M-Series Sonar. The following describes how to install the ProViewer software on a user supplied PC. For more information on ProViewer and integration see the ProViewer Software Manual found on the software CD as well as under the software's help menu.

Note: Running other applications in conjunction with the ProViewer Software may affect performance of one or both of the applications.

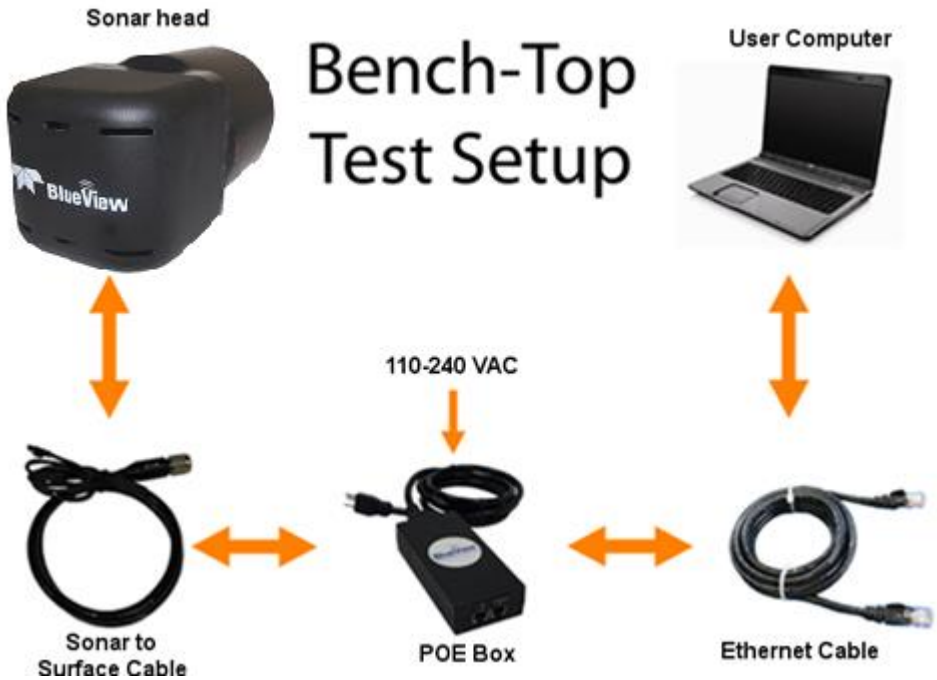
1) Place the ProViewer CD-ROM in the CD-ROM drive. Installation will start automatically.

   If the CD-ROM drive does not automatically run:

   Select **Run** from the **Start** menu, and type **x:\setup** in the **Open** box (where x is the drive letter for the CD-ROM drive), then click **OK**.

2) The Welcome window opens. Click **Next**.

3) Follow the instructions on the screen to complete the installation



Assemble the System

After installing ProViewer, the M-Series Sonar is ready for standalone operation. The only additional items required are the included Power Over Ethernet box (POE) and Sonar to Surface Cable. The diagram illustrates the proper connections needed for the system to function properly.

Recommended Assembly Procedure

1. Inspect all cable connector contacts to ensure no moisture, corrosion, or damage exists before assembling the system.
2. Connect the 10 pin underwater connector on the Sonar to Surface Cable to the mating bulkhead connector on the rear of the sonar. Once connected, ensure that the connector is fully engaged and tightened.
3. Connect the RJ45 connector on the Sonar to Surface Cable to the **"SONAR J1"** port on the POE Junction Box.
4. Connect one end of the Standard Ethernet Cable to the **"PC J2"** port on the POE Box.

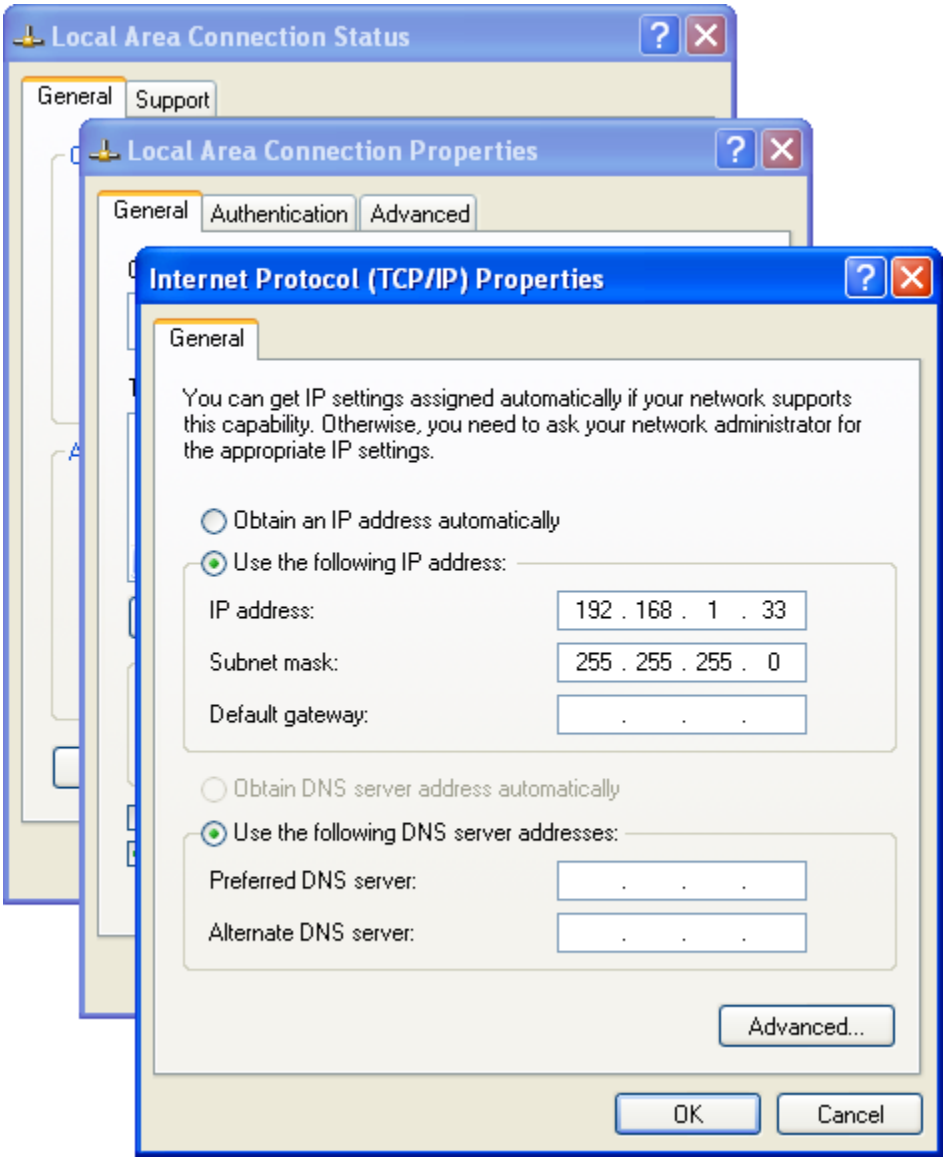
> **Note**: The Sonar Head cabling is conveniently designed so that you can connect your POE Box to a PC with a **standard** Ethernet cable.

5. Connect the other end of the Standard Ethernet Cable to the Ethernet port on the User computer.
6. Plug the POE Box power cable into a standard 120 or 220 VAC wall outlet. The Sonar Head will power up and initialize itself in approximately 40 seconds. Correct operation requires that power be cycled from the AC side of the Junction Box. **If you cycle the power off briefly, make sure you leave the power unplugged for at least 10 seconds.**
7. Turn on your computer.

Running ProViewer

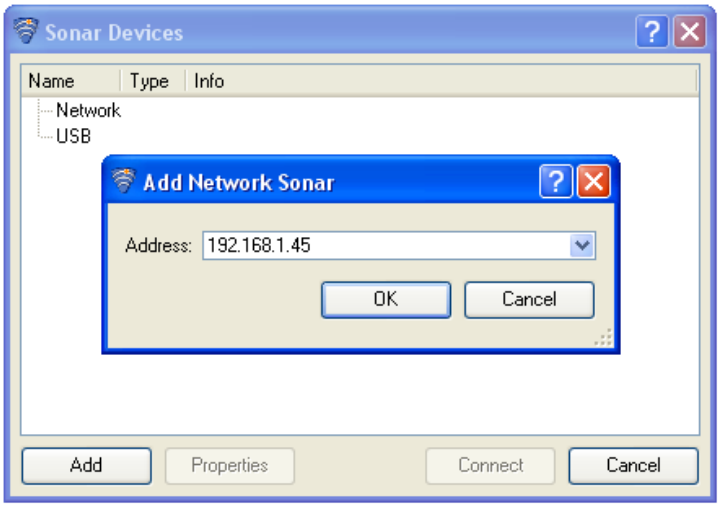
Once your sonar system is connected and turned on, it's time to connect your PC to the sonar.

1. The IP address on the user's PC will need to be set either to "Obtain an IP address automatically," or to a static IP: 192.168.1.x where x is any number besides 45 that doesn't conflict with the user's system:



2. Open the ProViewer Software on the User Computer and click on the connect button.
3. The Proviewer software will display the available sonar heads to connect to.

4. Select the desired head and click **Connect**, or just double click the desired head.
5. If a sonar head still does not appear **when used in stand-alone mode**, click the **Add** button and type 192.168.1.45, the default Sonar IP address for the M-Series Sonar.



6. For Troubleshooting issues, please visit Chapter 8 “Troubleshooting”. If you still cannot connect, contact Teledyne BlueView, Inc. for support

Firewall Software

ProViewer Software communicates with the Sonar Head using standard networking protocols. If your PC has firewall software, you may see a warning “popup” that asks permission to allow the ProViewer Software to connect to the Sonar. In that case, you may need to configure the firewall to allow communications between your Sonar and your PC using TCP and UDP on port 1149. Refer to your anti-virus software vendor or your computer tech support resources for assistance with your anti-virus software.

Shutdown

To shutdown the sonar, close the Sonar Window by clicking on the **X** icon in the top right-hand corner of the window, or select **Exit** from the **File** menu to close the entire program. To avoid data loss, be sure to close and save any sonar data files before removing the sonar power. It is now safe to power down the sonar or disconnect the sonar Ethernet cable from the computer.

When power cycling the sonar, be sure to allow at least 10 seconds of ‘off time’ before turning the sonar back on.

Chapter 4: Bench Top Setup VDSL

The following chapter contains step by step instructions for setting up your Teledyne BlueView, Inc. sonar using VDSL connection.

Assemble the System for VDSL Connectivity

The VDSL option enables communication over a single twisted pair. The figure below depicts how the components are interconnected. Your sonar and VDSL top side box may look different than the ones depicted below.

VDSL Dip Switch Settings	
1	On
2	Off
3	On
4	Off

LED	Status	Operation
Power	Green	The device is powered on.
	Off	The device is powered off.
VDSL	Green	The port is connected.
	*Blinking Green	Data transceiving.
	Off	No valid link on this port
10/100M	Green	The port is connected.
	*Blinking Green	Data transceiving.

Once the converter connects to a power source, the LEDs of 10/100M will blink once, and the converter begins looking for other converter automatically. During searching, the VDSL LEDs keeps blinking; it will stop blinking after successful detection.

Recommended Assembly Procedure

1. Inspect all cable connector contacts to ensure no moisture, corrosion, or damage exists before assembling the system.
2. Connect the underwater connector on the “25ft Sonar to Surface Test Cable” to the mating bulkhead connector on the rear of the sonar head. Make sure that all o-rings are present and in good shape before making the connection. Once connected, ensure that the connector is fully engaged and tightened.Connect the RJ45 connector on the Sonar to Surface Cable to the **“SONAR J1”** port on the POE Junction Box.
3. Connect the RJ11 connector on the Sonar to Surface Test Cable to the “VDSL” port on the VDSL Top Side box.
4. Plug the power cable to the VDSL Top Side box to a standard wall outlet.
5. Connect the RJ45 connector of the 25 ft cable to the “SONAR J1” port on the POE Box.
6. Connect one end of the Standard Ethernet Cable to the “LAN” port on the VDSL Top Side Box.
7. Connect the other end of the Standard Ethernet Cable to the Ethernet port on the User computer.
8. Plug the POE box power cable and the VDSL power cable into a standard wall outlet. The sonar head will power up and initialize itself in approximately 60 seconds.

   Note: When power cycling, correct operation requires that power be cycled from the AC side of the POE box. If you cycle the power off briefly, make sure you leave the power unplugged for at least 10 seconds.
9. Turn on your computer.
10. Start ProViewer, and click the “Connect” button.
11. For Troubleshooting issues, please visit Chapter 8 “Troubleshooting”. If you still cannot connect, contact Teledyne BlueView, Inc. for support

Chapter 5: Sonar Installation

Mount the Sonar

After installing your software and running your sonar for the first time, you're ready to put the sonar into the water.

In order to do this, the sonar needs a mounting structure to hold it securely in its underwater environment. This mount can either be one purchased from Teledyne BlueView, Inc. or a customer supplied mount. The preferred mounting method is a clamp type fixture around the cylindrical portion of the unit. For custom mounts, refer to the technical drawings provided in the appendix of this manual for sonar dimensions.

Mounting Location

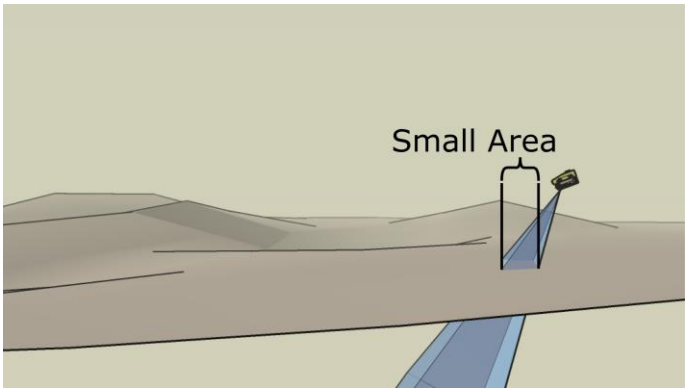
The sonar images like a camera out of the front of the nose cone. It should be mounted looking forward, preferably on the same pan-and-tilt as the ROV's main camera.

Sonar Up-Down Orientation

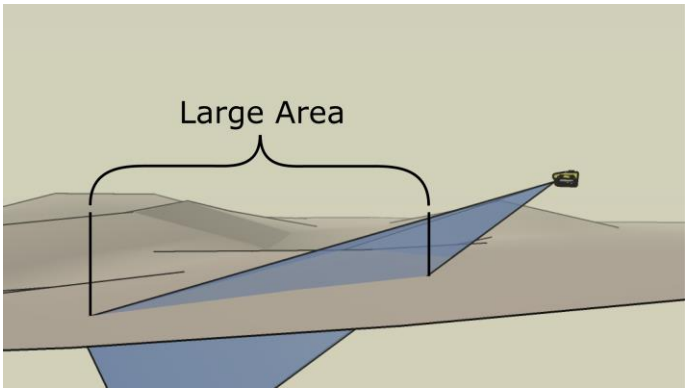
The Teledyne BlueView, Inc. logo on the front of the sonar is used to determine the up-down orientation of the sonar (pictured below).

Sonar Angle

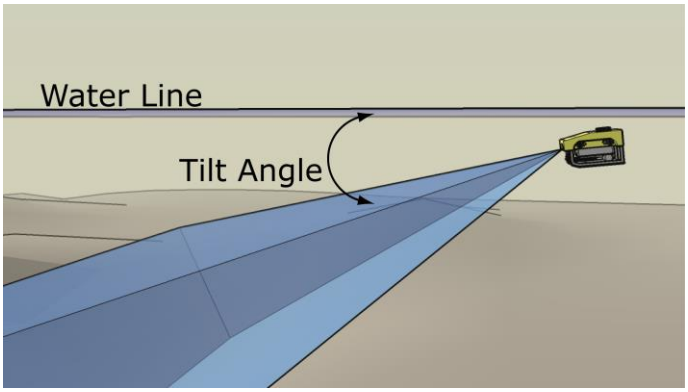
To achieve optimal performance while imaging targets and/or the bottom at a given depth, the angle that the sonar is tilted down from the surface is important. This issue is demonstrated in the figures below. On the left, the sonar is tilted down at a steep angle that provides only a narrow field of view of the bottom. The sonar on the right-hand figure is set at a much shallower angle that provides both a better perspective on targets and a larger field-of-view of the bottom.



The sonar's steep tilt-angle in this figure produces imagery of a narrow strip of the bottom.



The sonar's shallow tilt-angle in this figure produces an image of the bottom over a broad area. In general, shallower tilt-angles, which give larger areas of bottom imaging, are preferred.



Recommended tilt angles.

Target Depth (ft)	0	10	20	30	40	60	80
Approx. Tilt Angle(Deg)	0	3	8	10	10	15	20

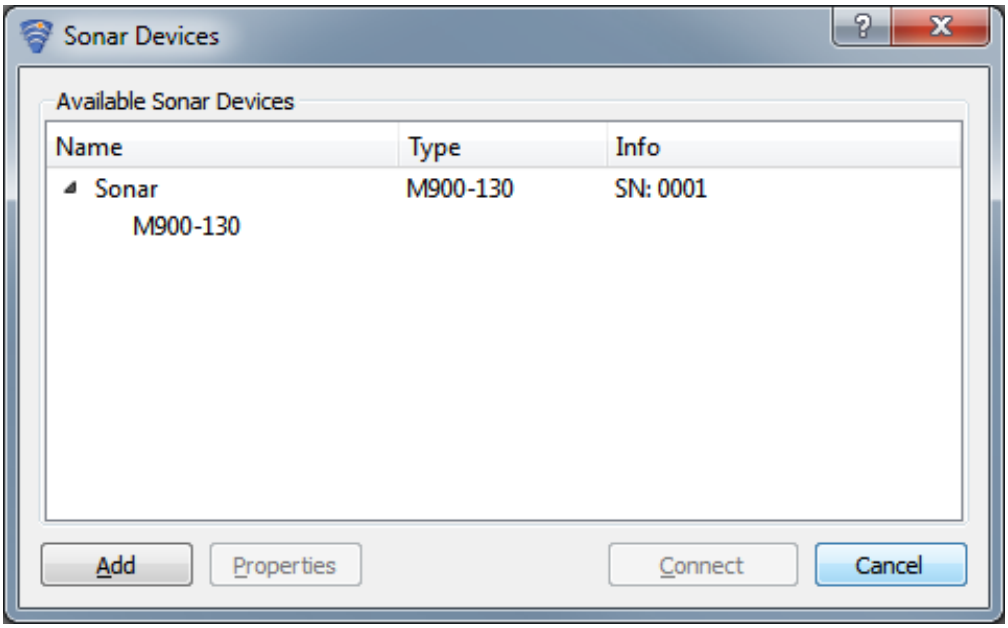
Chapter 6: Advanced Sonar Operation

Changing the Sonar IP Settings

As communication with the M-Series sonar is handled through an Ethernet interface, the sonar requires an IP address to function properly. There are 3 ways to accomplish this – static IP, DHCP server, or DHCP host – but the system is shipped from the factory with a static IP address of 192.168.1.45 and a DHCP server enabled. These settings, however, can be changed using the ProViewer Software.

Note: The ability to change IP settings is an advanced feature of the ProViewer software and is only recommended for users familiar with IP settings and network configurations. **Incorrect settings can result in the loss of communication with the sonar**.

1) With the M-Series sonar powered and connected, open the ProViewer software and click the connect button.
2) In the window that comes up, select the M-Series sonar then click the **Properties** button.



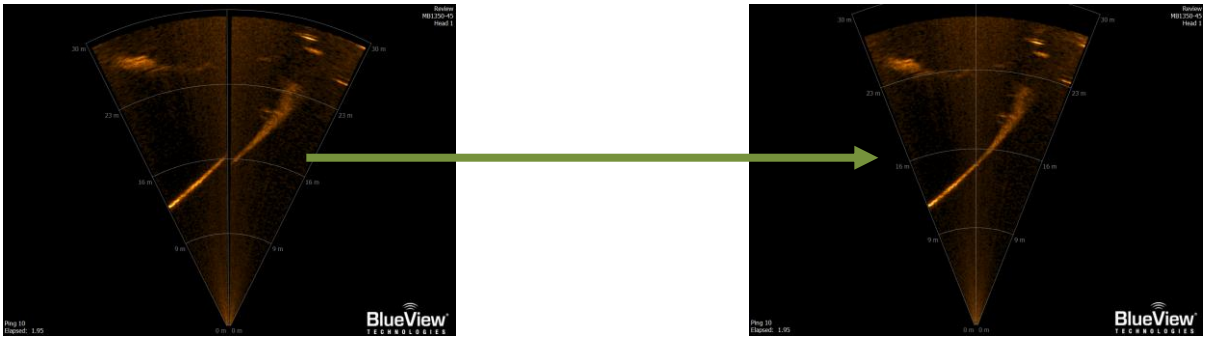
3) In the window that appears, select the **Network** tab. Change the IP settings to the desired values and click **Save**.
4) Restart the M-Series Sonar.

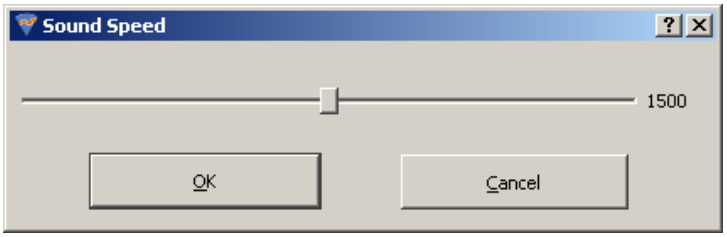
Note: By factory default, the sonar provides DHCP service to the computer or network it is attached to. If your network has a DHCP server operating, you should disable the sonar DHCP server before connecting it to the new network.

Note: The sonar Ethernet wiring is designed to connect directly to a PC network card (i.e. it is wired as a crossover cable). You can connect your sonar to an 'auto sensing' network device with the same cable you use to attach to a PC.

Image Calibration

If an image looks broken or misaligned, press CTRL-J to bring up the Image Calibration dialog. The slider will align the center of the image.





When You Forget the M-Series Sonar's IP Address

To connect with the sonar, the M-Series Sonar's IP address must be compatible with the network or computer to which it is attached. If you mis-configure the sonar's network settings and are unable to connect to it, follow this procedure to re-establish communications with the sonar:

1. Connect the sonar communication cable directly to a Windows computer's network interface card.
2. As described above, open the Internet Protocol (TCP/IP) Properties window for the network interface card you plugged the sonar into.
3. Under the General tab, select 'Obtain an IP address automatically'.
4. Under the Alternate Configuration tab, select 'Automatic private IP address' and click OK.
5. Close the rest of the windows folders you opened.
6. Cycle the sonar power off (for at least 10 seconds), then turn the sonar back on.
7. After about 100 seconds, the Widows PC and the sonar should have negotiated a 'link local' IP address (in the range of 169.254/16).
8. Using the ProViewer software, connect normally and reconfigure the sonar's network settings to be compatible with its intended network.

Chapter 7: Maintenance

Before Use

1. Prior to assembly of components, ensure that all connector contacts are clean, dry and free of dirt and/or corrosion.
2. Inspect sacrificial zinc anode on rear bulkhead of sonar head and replace if it appears that more than half of the anode has been lost to corrosion.
3. Inspect all cables and connectors for abrasion, cuts or cracks. Repair or replace as needed.
4. Inspect anodized sonar shell and front and rear bulkheads for excessive corrosion. If there is any question as to usability with the extent of any corrosion, contact Teledyne BlueView, Inc.
5. Inspect front and rear bulkhead joints of sonar head to insure the (8) flush mount housing screws are in place. (Note: these are not a field replaceable item and should never be removed except by factory trained personnel).

After Use

1. After use, rinse the sonar, rear connector on the sonar, and the sonar cable with a solution of mild soap and fresh water. At this time, inspect all components for corrosion, wear or damage. This includes the sonar, connectors, cables, and anode. Replace any component showing corrosion or damage.
2. Clean the connectors on the sonar cable and the connector on the rear bulkhead of the sonar unit with alcohol. (Note: the connector on the rear bulkhead of the sonar unit is NOT a field replaceable item. If any damage is detected, please contact Teledyne BlueView, Inc. for an RMA number to return the sonar to the factory for replacement, repair, and re-test.)
3. Apply 3M silicon spray lube or equivalent to the external mating surface of the sonar connector and the internal mating surface of the sonar cable connector. Do not grease.
4. Check that the anode is in place and it has not deteriorated. Replace as necessary. More than 50% should remain or the anode should be replaced. When replacing the anode, make sure the surface under the anode is bare and bright before the anode is installed to ensure good electrical contact. For replacement anode, please contact Teledyne BlueView, Inc.

Chapter 8: Troubleshooting

Possible Cause	Solution
No Power	Confirm that the POE Box is plugged into a standard 120 or 220 VAC outlet and that the small green LED on the POE Box is illuminated. Check that the Sonar-to-Surface cable is plugged into the **SONAR J1** port on the POE Box.
Improperly connected	In addition to the connections described above, verify that you have a good cable between the computer Ethernet port and the **PC J2** port on the POE Box.
Bad State	Reset the sonar by removing the POE box AC power cord for 10 seconds. The sonar head takes 40 seconds to reboot after power is re-applied.
Dirty connectors	Make sure that all connector pins are clean and corrosion free.
Improper Ethernet cable	The Sonar Head cabling is conveniently designed so that you can connect your POE Box to a PC with a **standard** Ethernet cable. However, when connecting your POE Box to a network hub, a crossover Ethernet cable is required **unless** your network hardware is capable automatically handling crossed Ethernet cables.
PC networking software is confused	Restart the networking software. There are several ways to do this depending on your particular operating system: Open the windows network connection window and right click on the Ethernet connection. Select **repair** or **disable** then **enable**. You can also simply restart the computer or cycle the power on the sonar.

IP subnet masks don't match	Make sure the subnet mask is **the same** on both PC and sonar. For the factory default Class C network configuration, the subnet mask is 255.255.255.0. The 255 defines the **network** portion of the IP address. The 0 defines the **device** portion of the IP address.
IP network addresses don't match.	Make sure the IP **network** part of the IP address is **the same** on both the sonar and the computer. In the factory default case, this is the first 3 numbers in the IP address: 192.168.1.
IP network device addresses are the same.	The **device** part of the IP address must be **different** for every device on the network. In the factory default case, the sonar is set to 45 and the PC is set to 3. Do not use 255 as it is reserved for broadcast use.
PC ARP table is stale.	In the ProViewer Sonar Devices window, click the **Add** button and enter the IP address you think the sonar is set to respond to, then click **OK**. The sonar should respond within several seconds. Alternatively, the PC power can be cycled to refresh the ARP table.
Poor connection quality	Use an ohmmeter to verify **Tx** and **Rx** line connectivity between the Ethernet connector that plugs into the PC and the 10 pin connector that plugs into the Sonar Head. Refer to ProViewer Sonar to Surface Cable Drawing in the Appendix for pin to pin connection information.

Image Updates Seem Slow

Possible Cause	Solution
Ethernet congestion	Shut down any other computers or services that are consuming the Ethernet network bandwidth
Range settings	When your sonar pings, it must wait for the echo to return from a distant object; long range settings directly cause slow updates. Reduce the **Range Stop** distance to increase the update rate.
GUI window size	The larger the displayed sonar image, the longer it takes for the ProViewer software to construct the image. To increase the image display update rate, decrease the size of the sonar image display window by grabbing one of sides or corner of the GUI and dragging it towards the center of the GUI window.

Still not working?

Please contact us:

Teledyne BlueView, Inc. Customer Support

www.blueview.com

206-545-7260

8am – 5pm PST Mon through Fri

Appendix A: Technical Specifications

	M900-45-S-STR-MKS-VDSL	M900-45-S-STR-BR-VDSL	M900-45-S-ANG-MKS-VDSL	M900-45-S-ANG-BR-VDSL
Sonar				
Field-of-View	45º	45º	45º	45º
Max. Range	100m (328 ft.)	100m (328 ft.)	100m (328 ft.)	100m (328 ft.)
Beam Width	1º x 20º	1º x 20º	1º x 20º	1º x 20º
Number of Beams	256	256	256	256
Beam Spacing	0.18º	0.18º	0.18º	0.18º
Range Resolution	1 in.	1 in.	1 in.	1 in.
Update Rate	Up To 15 Hz	Up To 15 Hz	Up To 15 Hz	Up To 15 Hz
Frequency	900 kHz	900 kHz	900 kHz	900 kHz
Mechanical				
Weight in Air	---	---	---	---
Weight in Water	---	---	---	---
Depth Rating	1,000m	1,000m	1,000m	1,000m
Size*	8.8 in. x 4.0 in.	8.8 in. x 4.0 in.	9.4 in. x 4.8 in.	9.4 in. x 4.8 in.

*See Outline Drawings for Exact Dimensions.

Appendix A: Technical Specifications (Cont.)

	M900-45-G-STR-LT-MKS-VDSL	M900-45-G-ANG-LT-MKS-VDSL
Sonar		
Field-of-View	45º	45º
Max. Range	100m (328 ft.)	100m (328 ft.)
Beam Width	1º x 20º	1º x 20º
Number of Beams	256	256
Beam Spacing	0.18º	0.18º
Range Resolution	1 in.	1 in.
Update Rate	Up To 15 Hz	Up To 15 Hz
Frequency	900 kHz	900 kHz
Mechanical		
Weight in Air	---	---
Weight in Water	---	---
Depth Rating	300m	300m
Size*	8.8 in. x 4.0 in.	8.8 in. x 4.0 in.

*See Outline Drawings for Exact Dimensions.

Appendix A: Technical Specifications (Cont)

	M900-90/130-S-STR-MKS-VDSL	M900-90/130-S-STR-BR-VDSL	M900-90/130-S-ANG-MKS-VDSL	M900-90/130-S-ANG-BR-VDSL
Sonar				
Field-of-View	90º/130º	90º/130º	90º/130º	90º/130º
Max. Range	100m (328 ft.)	100m (328 ft.)	100m (328 ft.)	100m (328 ft.)
Beam Width	1º x 20º	1º x 20º	1º x 20º	1º x 20º
Number of Beams	512/768	512/768	512/768	512/768
Beam Spacing	0.18º	0.18º	0.18º	0.18º
Range Resolution	1 in.	1 in.	1 in.	1 in.
Update Rate	Up To 15 Hz	Up To 15 Hz	Up To 15 Hz	Up To 15 Hz
Frequency	900 kHz	900 kHz	900 kHz	900 kHz
Mechanical				
Weight in Air	4.3 lbs	---	---	---
Weight in Water	1.1 lbs	---	---	---
Depth Rating	1000m	1000m	1,000m	1000m
Size*	8.8 in. x 4.0 in.	8.8 in. x 4.0 in.	9.4 in. x 4.8 in.	9.4 in. x 4.8 in.

*See Outline Drawings for Exact Dimensions.

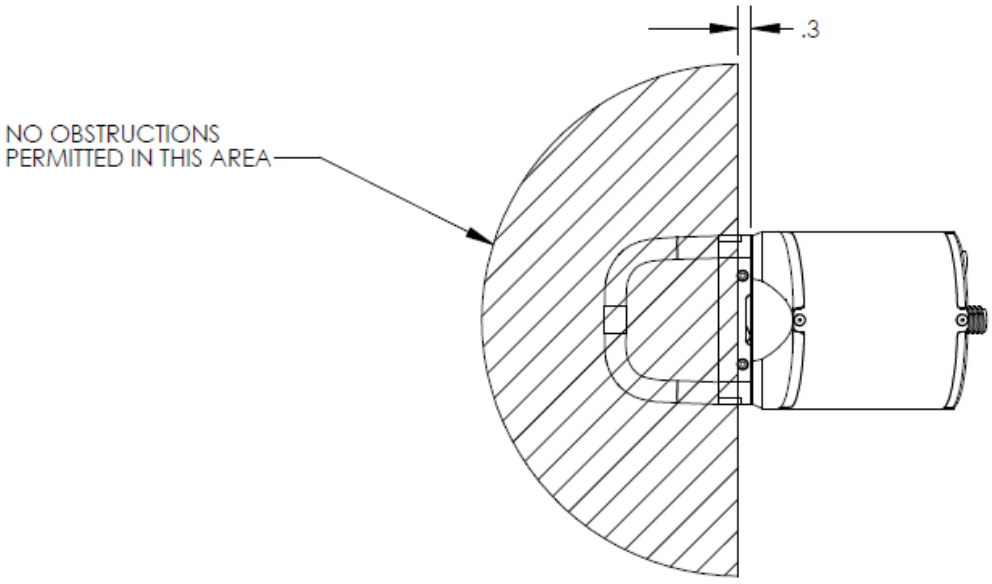
Appendix A: Technical Specifications (Cont)

	M900-90/130-G-STR-LT-MKS-VDSL	M900-90/130-G-STR-ANG-LT-MKS-VDSL
Sonar		
Field-of-View	90º/130º	90º/130º
Max. Range	100m (328 ft.)	100m (328 ft.)
Beam Width	1º x 20º	1º x 20º
Number of Beams	512/768	512/768
Beam Spacing	0.18º	0.18º
Range Resolution	1 in.	1 in.
Update Rate	Up To 15 Hz	Up To 15 Hz
Frequency	900 kHz	900 kHz
Mechanical		
Weight in Air	4.3 lbs	---
Weight in Water	1.1 lbs	---
Depth Rating	300m	300m
Size*	8.8 in. x 4.0 in.	8.8 in. x 4.0 in.

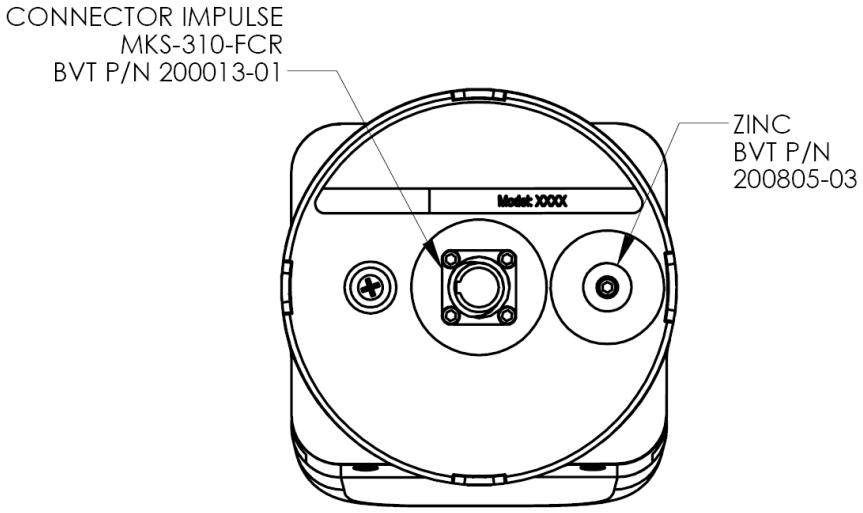
*See Outline Drawings for Exact Dimensions.

Appendix B: Mechanical Drawings

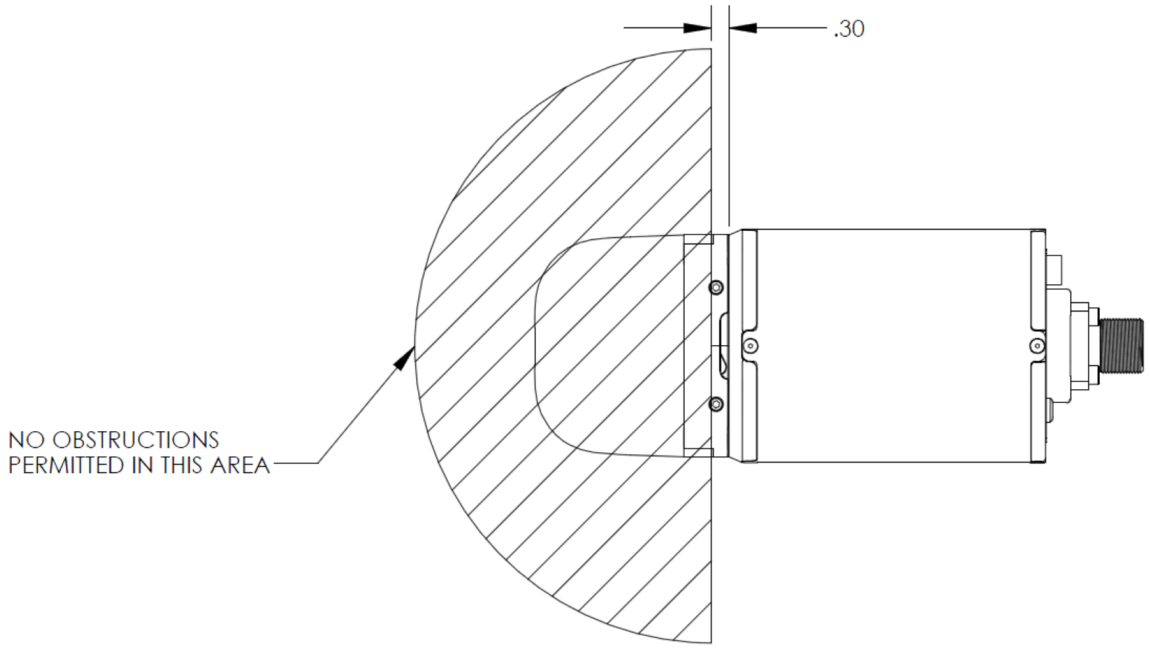
MKS CONNECTOR VERSION



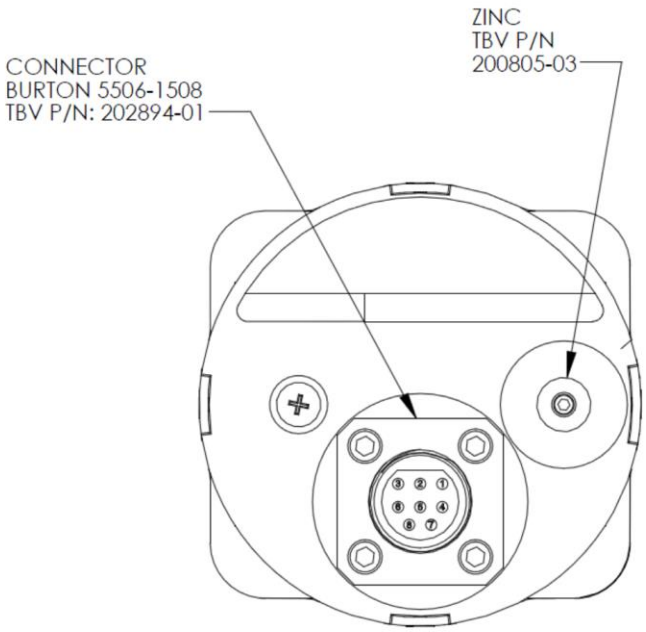
ALL DIMENSIONS ARE IN INCHES



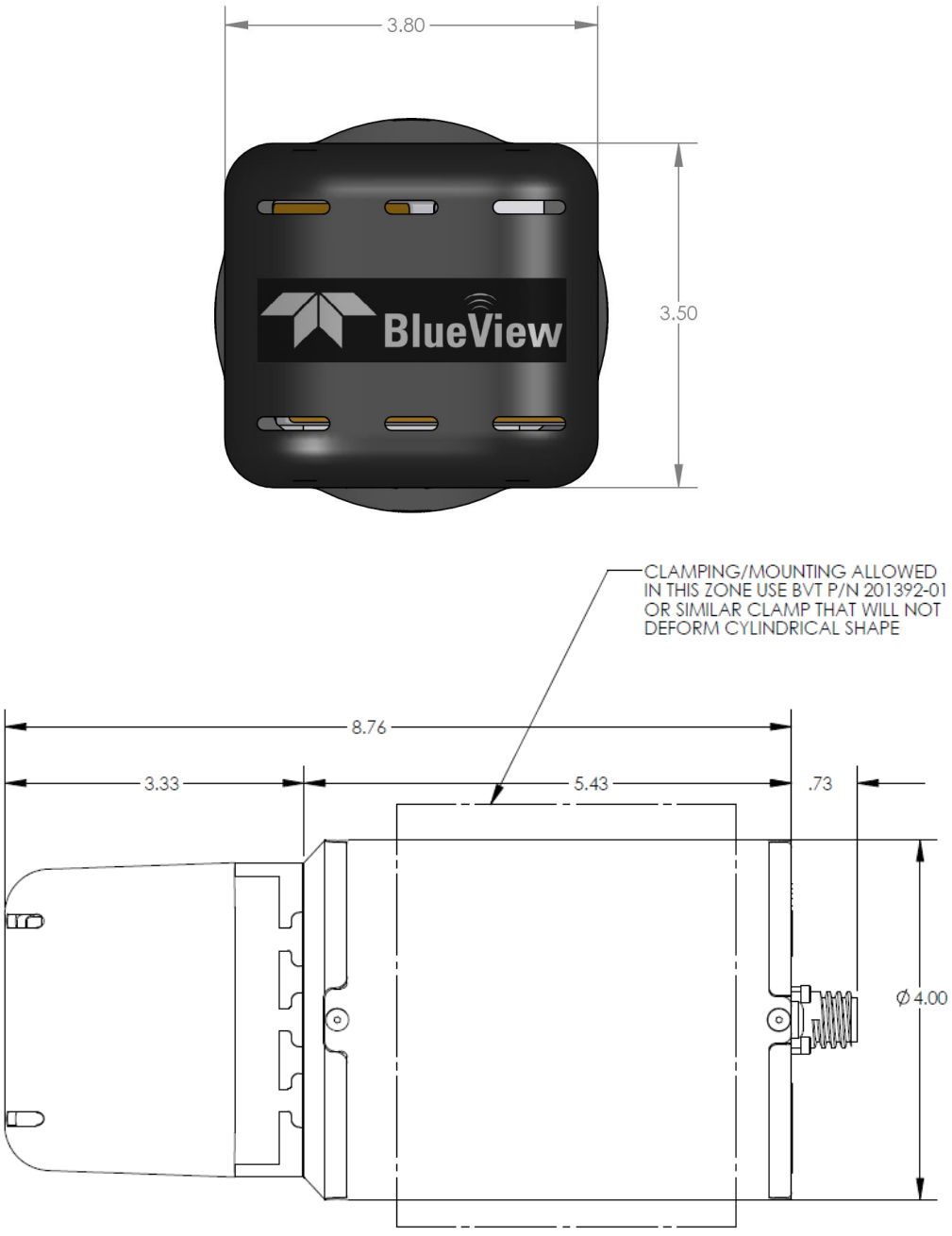
BR CONNECTOR VERSION



ALL DIMENSIONS ARE IN INCHES

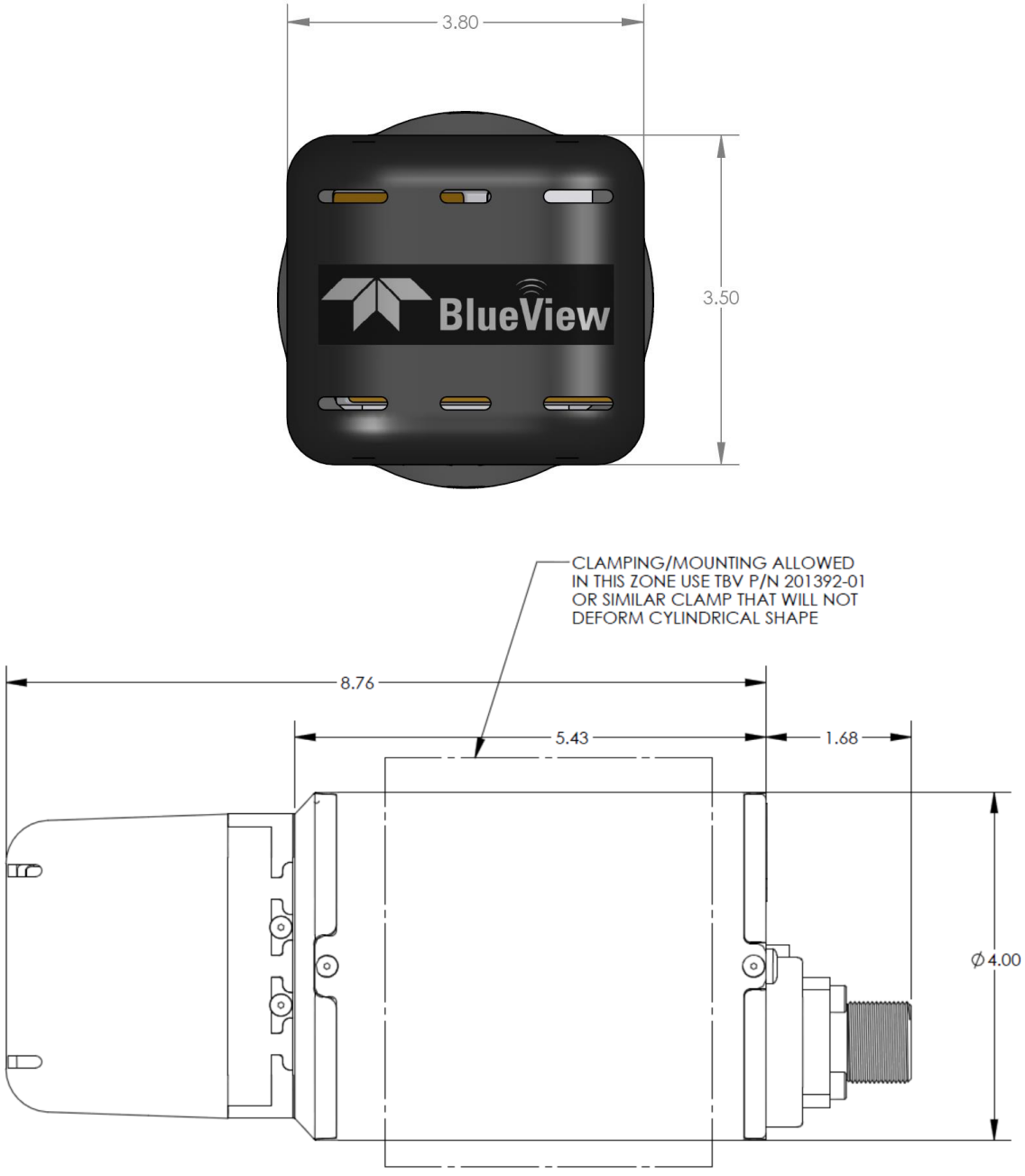


M900-45/90/130-S-STR-MKS-VDSL and M900-45/90/130-G-STR-LT-MKS-VDSL Outline Drawing



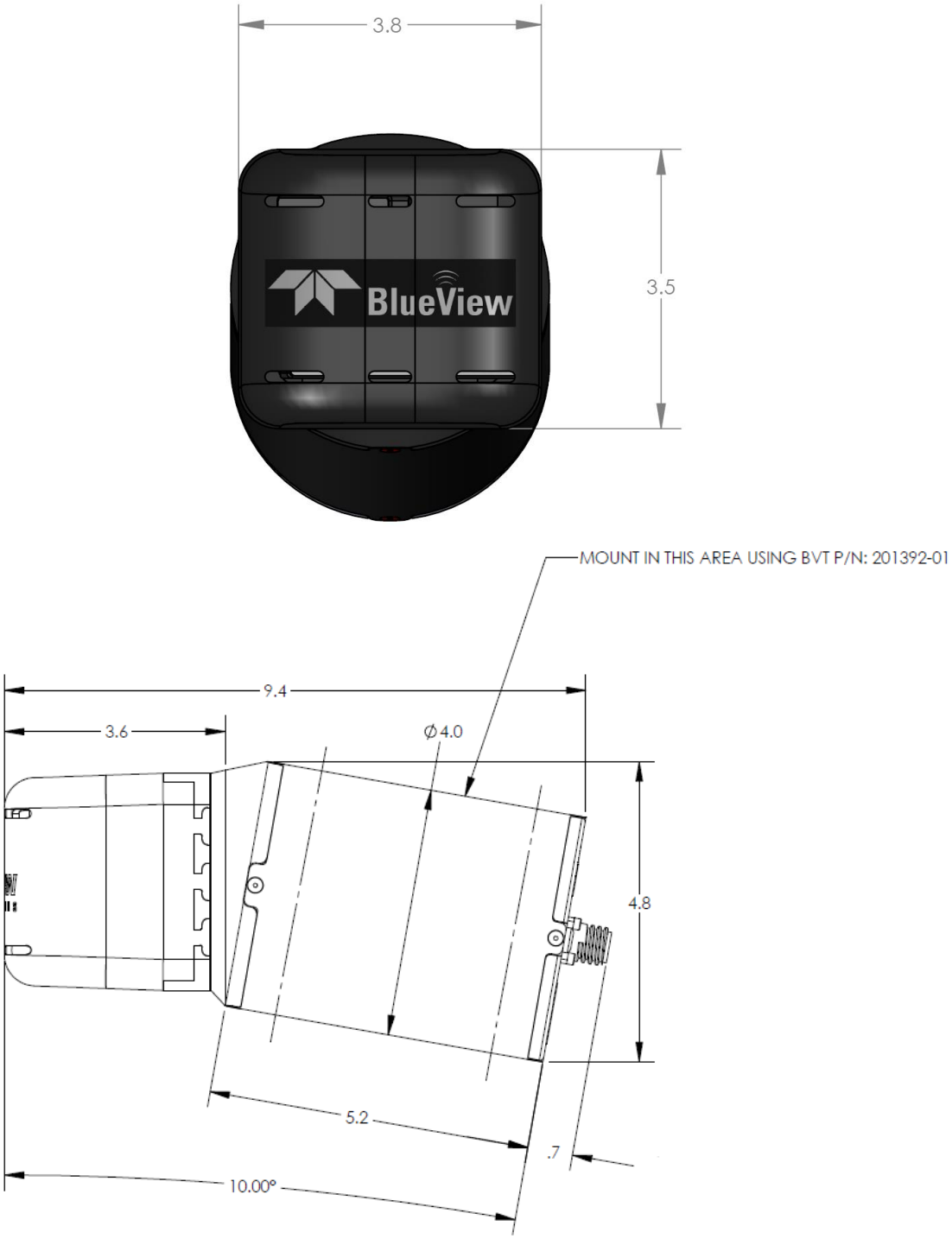
ALL DIMENSIONS ARE IN INCHES

M900-45/90/130-S-STR-BR-VDSL Outline Drawing



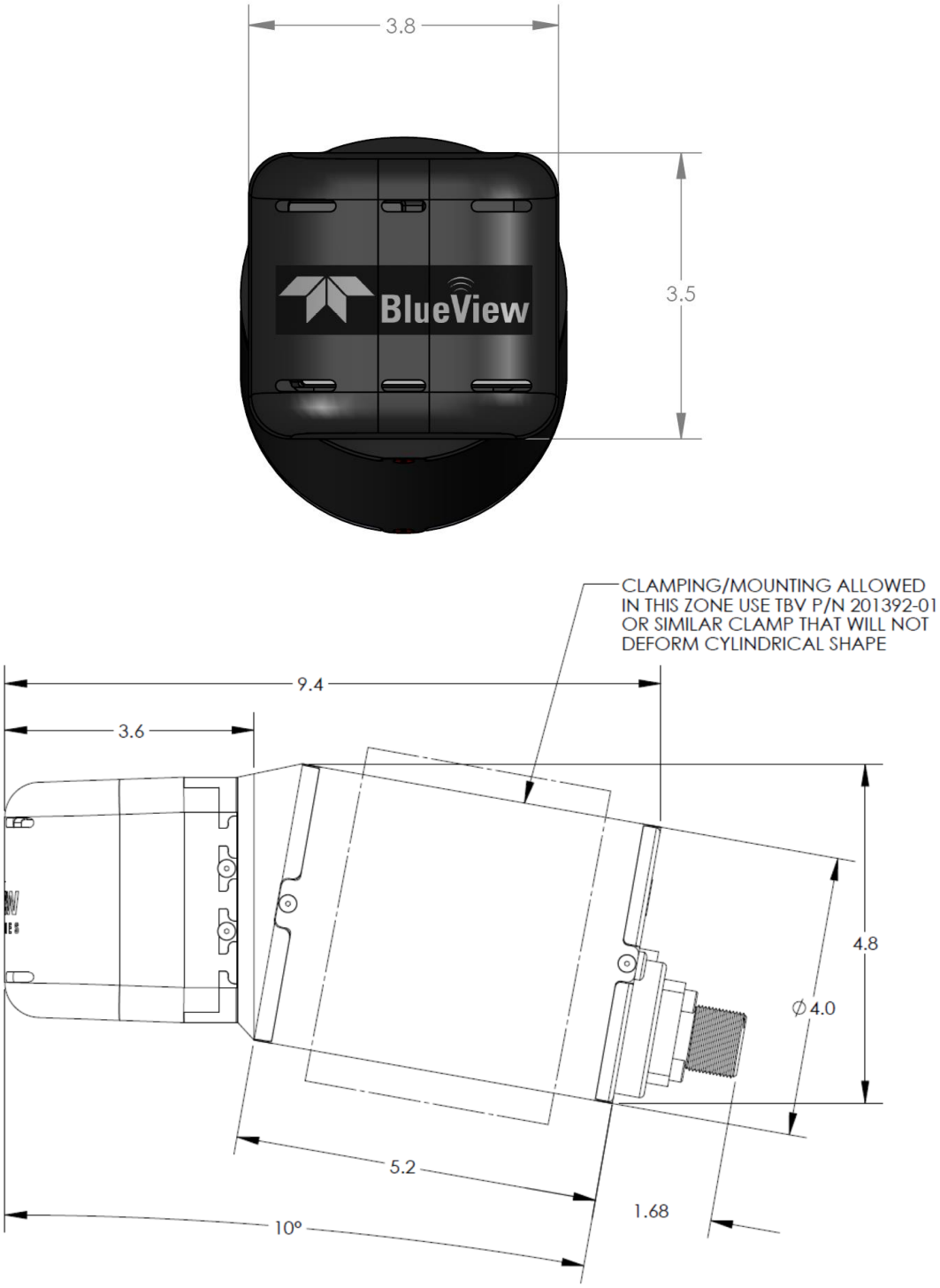
ALL DIMENSIONS ARE IN INCHES

M900-45/90/130-S-ANG-MKS-VDSL and M900-45/90/130-G-ANG-LT-MKS-VDSL Outline Drawing



ALL DIMENSIONS ARE IN INCHES

M900-45/90/130-S-ANG-BR-VDSL Outline Drawing



ALL DIMENSIONS ARE IN INCHES

Appendix C: Cable Diagrams

MKS Sonar to Surface Cable w/VDSL

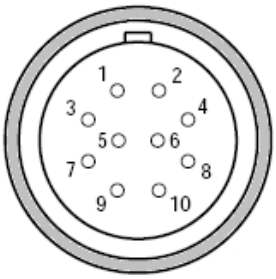


TABLE 1				
PIN (J1)	CONDUCTOR COLOR	SIGNAL REF.	PIN RJ11	PIN RJ45
1	ORANGE / WHITE	Rx +		1
2	ORANGE	Rx -		2
3	GREEN / WHITE	Tx +		3
4	RED (20 AWG)	POWER		4
5	WHITE (20 AWG)	POWER		5
6	GREEN	Tx -		6
7	BLACK (20 AWG)	GROUND		7
8	GREEN (20 AWG)	GROUND		8
9	BROWN	VDSL A	2	
10	BROWN / WHITE	VDSL B	3	

BR Sonar to Surface Cable w/VDSL

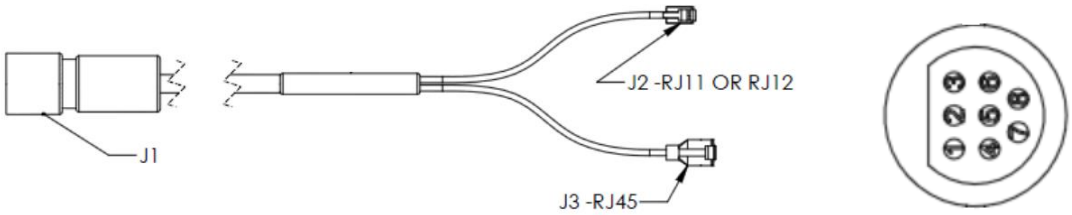


TABLE 1 INTERCONNECTION				
SIGNAL	J1 (CONNECTOR)	CONDUCTOR COLOR	J2 RJ11 OR RJ12	J3 RJ45
RX+	1	ORG/WHT		1
RX-	2	ORG		2
TX+	3	GRN/WHT		3
12-48V	4	RED (20 AWG)		4
		WHT (20 AWG)		5
VDSL A	5	BRN	EITHER OF MIDDLE 2 CONTACTS	
TX-	6	GRN		6
GROUND	7	BLK (20 AWG)		7
		GRN (20 AWG)		8
VDSL B	8	BRN/WHT	EITHER OF MIDDLE 2 CONTACTS	

MKS Cable Whip

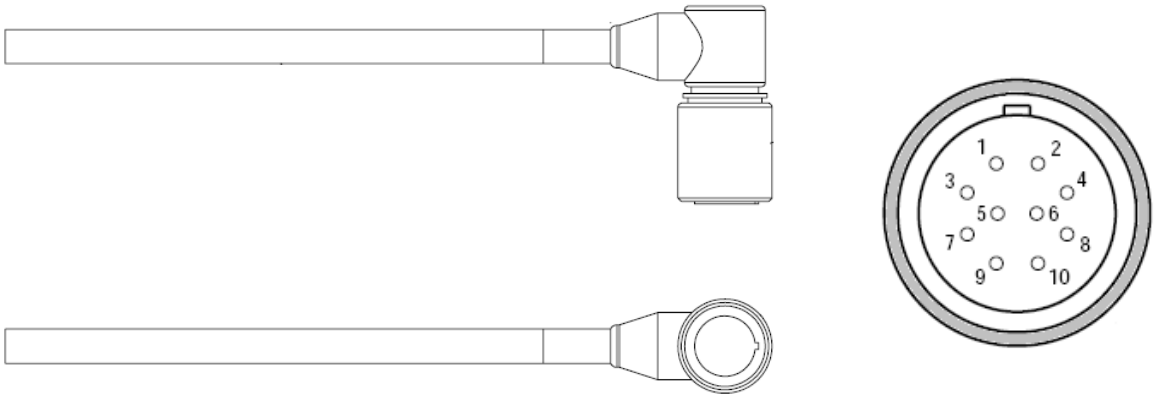


TABLE 1 INTERCONNECTION		
PIN (J1)	CONNDUCTOR COLOR	SIGNAL REF.
1	ORANGE / WHITE	Rx +
2	ORANGE	Rx -
3	GREEN / WHITE	Tx +
4	RED (20 AWG)	POWER
5	WHITE (20 AWG)	POWER
6	GREEN	Tx -
7	BLACK (20 AWG)	GROUND
8	GREEN (20 AWG)	GROUND
9	BROWN	VDSL A
10	BROWN / WHITE	VDSL B

BR Cable Whip

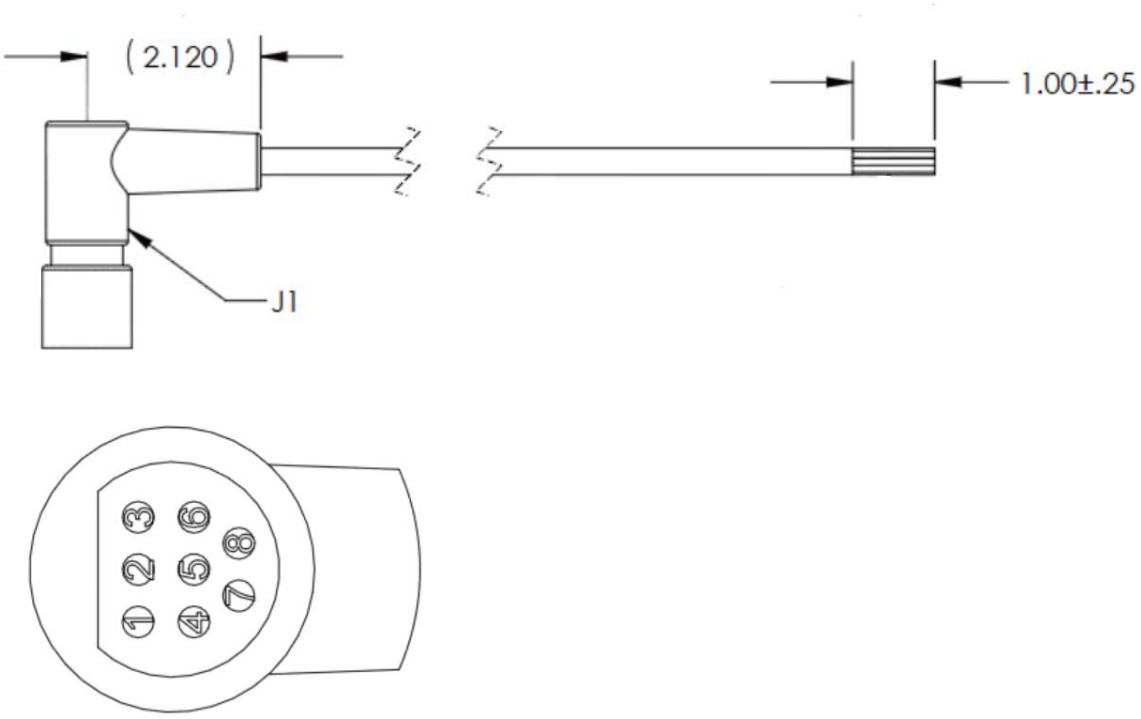
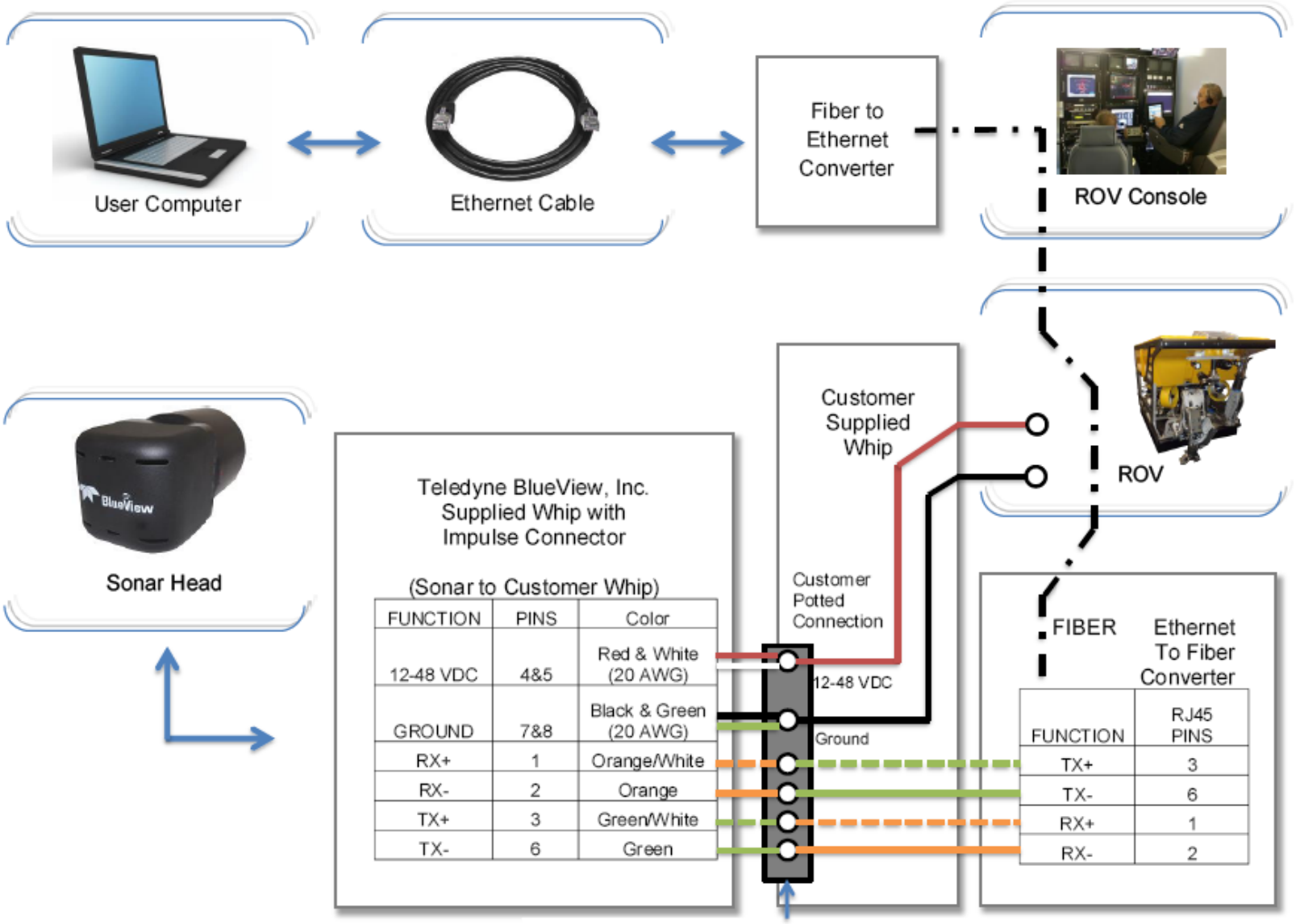


TABLE 2 – BURTON INTERCONNECTION TABLE		
PIN (J1)	**CONDUCTOR COLOR**	**SIGNAL REF**
1	ORG/WHT	Rx+
2	ORG	Rx-
3	GRN/WHT	Tx+
4	RED (20 AWG)	12-48 VDC
	WHT (20 AWG)	
5	BRN	VDSL A
6	GRN	Tx-
7	BLK (20 AWG)	GRN
	GRN (20 AWG)	
8	BRN/WHT	VDSL B

ROV Interface Setup



Note: If no sonar communication, try a straight Ethernet connection. (Swap 1 & 3, 2 & 6)

ROV Interface Setup using VDSL

User Computer

Ethernet Cable

VDSL TOPSIDE BOX

FUNCTION	RJ45 PINS
VDSL A	2
VDSL B	3

ROV Console

Sonar Head

Teledyne BlueView, Inc.
Supplied Whip with
Impulse Connector

(Sonar to Customer Whip VDSL)

FUNCTION	PINS	Color
12-48 VDC	4&5	Red & White (20 AWG)
GROUND	7&8	Black & Green (20 AWG)
VDSL A	9	Brown
VDSL B	10	Brown/White

Customer
Supplied
Whip

Customer
Potted
Connection

12-48 VDC

Ground

ROV